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THE REGENERATION OF THE EPITHELIUM OF THE CORNEA.

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PROF. ARNOLD, of Heidelberg, by a series of investigations published in the 46th vol. of *Virchow's Archiv*, has added a new view to those which had previously prevailed as to the manner of regeneration of the epithelium of the cornea, as well as of epithelium in general. Although this investigator did not succeed in obtaining a perfectly clear idea as to the details of the regenerative process, the following may still be considered as the result at which he arrived. Neither the connective tissue nor the remaining epithelium alone reproduces the lost epithelium, but the former with the influence of the latter. Arnold, indeed, states this nowhere with perfect distinctness; but from his whole description the unprejudiced reader derives this formula.

Arnold found on the surface of the cornea of the frog, where the epithelium had been removed by brushing with a camel's hair pencil, or by moistening with the tincture of cantharides, a finely granular substance. If the space from which the epithelium had been removed was small, it was completely filled by this substance; in greater spaces the substance was present only at the periphery. Next the edge of the epithelium this substance becomes homogeneous—protoplasma—and soon separates into plates (platten) of from double to tenfold the diameter of the ordinary cells. The actual regenerative processes take place in this protoplasma. Shining points (nucleoli) appear in the smaller plates which arise from division of the larger, and later faint circles appear around these nucleoli, the first indications of the contour of the nucleus. These circles become constantly more distinct, while at the same time the homogeneous substance of which the plates consist, first in the peripheral portion, and then throughout, becomes finely granular, similar in appearance to the protoplasma of the normal epithelium. This substance of the nuclei has meanwhile assumed a more granular character. Arnold therefore regards the finely granular zone at the epithelial edge as the matrix of that clear protoplasma which by division becomes new epithelium. On the other hand, he is less certain as to the origin of the finely granular substance itself. Although he does not deny the possibility that it is an exudation from the peripheral epithelium, which finally becomes protoplasma, let us say, again becomes cells, still he prefers to regard it as the product of the corneal tissue. The close connection of the edge of the epithelium with the corneal tissue; the enlargement of the corneal corpuscles in the neighborhood, and the fact that they are more completely filled with a finely granular substance; and, finally, the new formation of epithelium on the surface of connective tissue, independently of the surrounding epithelium, seem to him to speak in favor of this view. The last point Arnold states he has observed on the hard palate and skin of the head of the dog, after preventing healing from the periphery. He does not, however, entirely deny the influence of pre-existing cells; he thinks rather that these act in determining the character of the newly formed parts.

We have sought to test these views by means of our own investigations. If tincture of cantharides be dropped upon the cornea of the frog, the epithelium, so far as this is exposed to its action, becomes immediately opaque, and after a short time may be removed as a continuous membrane. Collodium and ether have a like effect. Still one succeeds generally only after repeated applications in removing the epithelium in continuo together with the collodium-coating. A single thorough application of these reagents is, however, sufficient to kill the cells, and so far to loosen their connection with the cornea, that a light brushing with a camel's hair pencil or the finger is sufficient to lay bare the corneal tissue. We have generally used

collodium in our experiments in order to avoid the greater irritation which is excited by tincture of cantharides. With some precaution, the epithelium may also be removed without injuring the corneal tissue, by scratching with a sharp knife. After the use of collodium or ether, the dead cells, observed fresh in aqueous humor, appear shrunken, their protoplasma opaque, the interstices between them wider; and their adhesion to the underlying tissue is greatly diminished. After immersion of the cornea for one or two minutes in a solution of one fourth per cent. of arg. nit., the spaces between the dead cells are filled with a thick precipitate of silver, and the cells themselves are darker colored than the still remaining normal cells. Thirty-six to forty-eight hours after the application of the collodium, the dead epithelium, perhaps with the exception of a few cells of the deepest layer, which remain *in situ* longest, has entirely disappeared. The edge of the unaffected epithelium is sharply defined; the corneal tissue bare to an extent proportionate to the surface which has been acted upon.

Before the dead cells have entirely disappeared, about twenty-four hours after the application of the collodium, the boundary between the normal and dead epithelium may, in arg. nit. preparations, be plainly seen. The normal epithelium appears clear and uncolored; the dead, opaque and brown. The cells of the latter are considerably smaller than those of the former, since they belong almost exclusively to the lower layers. The dead cells are also distinguished by a somewhat larger, round nucleus, and nucleolus. In many places in the neighborhood of the edge of the epithelium the dead cells are already pushed aside. The corneal tissue, so far as it is bare, is brown and opaque from a fine punctiform precipitate of silver. The clear normal cells, arched forward toward the centre of the cornea, stand sharply forth against the dark surroundings, having a narrow dark outline, the continuation of what appears as a line bounding the individual cells.

In other places the boundary of the normal epithelium is less distinct, the edge of the innermost cells, which are already in process of regeneration, being covered by a few dead cells. The growth of the peripheral cells is, therefore, spite of the presence of some dead cells, not prevented, since the growing epithelium undermines the still adherent dead cells.

The finely granular substance which, as Arnold states, fills the loss of substance in the epithelium, or makes a narrow border for it, is neither by this method, nor by that followed by Arnold, always present, and seldom occurs except in silvered preparations, while even in these it is not constant. This reason alone is sufficient to lead us to ascribe to it only a subordinate importance in the epithelial regeneration.

According to Arnold, the finely granular mass is changed into a homogeneous protoplasma, out of which only at a later period the new epithelium arises. It is difficult, however, to reconcile this assertion with the sharp boundary of the epithelium toward the granular substance, since we can scarcely consider that, in the whole length of the border, a sudden, equal metamorphosis takes place in that part of this substance which is directly in contact with the epithelium, and that its change into the homogeneous protoplasma is everywhere so perfect that the boundary between them never appears indistinct, nor allows a gradual melting of the one into the other to be observed. From the absence of the finely granular zone in many preparations, the conclusion might be drawn that it only remained a short time, and disappeared as soon as regeneration had fairly begun. This, also, we cannot allow, for the reason that it is seen almost exclusively after the use of arg. nit. This reagent, as already mentioned, produces upon the corneal surface a finely granular precipitate, particularly where it is covered with the *débris* of dead cells, not to speak of the thin layer of secretion from the conjunctiva, which by the movements of the globe and lids is pushed against the border of the epithelium, and here heaped up in the angle between it and the stroma.

The dark coloring of the bare silvered corneal tissue frequently extends over the boundary of the epithelium from one to five micromillimetres. The breadth of this dark border varies in many places, diminishing correspondingly to the incurvations at the edge of the epithelium, and it often shows several, usually three to five, seldom as many as ten, lines, which run parallel to the epithelial edge. These lines appear to arise from a successive diminution of the thickness of the protoplasma of the cells. Toward the periphery the color of the border gradually fades, yet its outer boundary has a sharp, though delicate contour. Arnold regards the portions of this border between the incurvations as plates, which project over the edge of the clear protoplasma-plates situated outside of it. He

gives, however, no farther explanation of the import of this appearance. The term plates (platten), we think, should not be used to describe the separate portions of this border, as one might thus be led to regard them as isolated bodies lying upon the corneal substance or imbedded in it. In fact, the border belongs to the corneal tissue itself, and evidently arises from the extension of the coloring of its substance produced by the silver, beyond the edge of the epithelium. If the epithelium be loosened and pushed aside from the parts underneath it by gentle pressure and sliding of the covering glass, which is easily accomplished after the application of glycerine and a little acetic acid, one is immediately convinced of the truth of this. Although at the same time the cells at the edge be broken up, the dark sub-epithelial border is plainly visible, passing over continuously into the dark color of the basis substance.

If we observe the freshly excised cornea of the frog, on which the epithelium is in process of regeneration, in aqueous humor, carefully avoiding all pressure, the epithelium appears as a homogeneous, water-clear, transparent layer, which at most, in many specimens, contains a few very fine granules in its substance. Nuclei are seen only here and there, and not very distinctly. The parts immediately bordering the loss of substance are not more hyaline than those in the periphery. On the other hand, it must be admitted that, on dead corneas the epithelium at the edge, on account of its lesser thickness, always appears somewhat clearer than the remainder. Only after waiting some time (half an hour) do the boundaries of the single cells distinctly appear. If Arnold did not wait till this period the circumstance is easily explained that he saw in the break in the epithelium only homogeneous, amorphous protoplasma. Even in silver preparations we do not find so large fragments of protoplasma as Arnold describes. Still, the elements of the edge are generally greater than the other cells, which they exceed two or three fold in dimension. Toward the periphery the size of the cells diminishes gradually. If we consider the cells as divided by concentric circles running parallel to the free boundary of the epithelium, the distance between them corresponding to the diameter of the individual cells, the inner zone will be the widest, while those immediately outside will be intermediate in width between it and the more peripherally situated ones. Certainly, here and there, isolated larger cells will always be present in the outer zones also.

Arnold states further that, in the innermost parts of the hyaline protoplasma small nucleoli first appear, and later the actual nucleus-substance around them. If we have rightly understood this author, these young nuclei, by means of the formation of new protoplasma toward the centre of the cornea, take a position farther from the edge. In his view, the more outward portion of the protoplasma appears granular and contains formed nuclei, while the inner, hyaline portion contains young nuclei and free nucleoli. So far as the appearance of free nuclei and nucleoli is concerned only, we are not disposed to deny this method of formation, but we must still assert that it is not a constant one. Much more frequently one meets with cells on the immediate edge of the epithelium, which contain peripherally situated nuclei in process of division, but no free nucleoli. Arnold appears to have over-estimated the number of the latter. Frequently the nucleoli are surrounded by a narrow, clear, but sharply defined zone, the outer boundary of which may, even if not very distinctly seen, be considered as that of a young nucleus. But one also finds, after the addition of reagents which make the outline of the nucleus quite distinct, free nucleoli, and near them, in the same cell, a similar one with a sharp nucleus-contour closely surrounding it, sufficiently often to make us consider a free formation of nuclei, as well as single and double division of the original nucleus, as very probable. At the same time we still believe it possible that the smaller nucleus originates from the greater one.

The epithelium grows at the edge of the loss of substance by increase in size and division of the marginal cells. The growth seems, however, not to be limited to the margin alone, but also to take place in the continuity of the original epithelium. At least, the presence of isolated larger cells with nuclei in process of division, scattered among the other cells at some distance from the edge, as well as the occurrence of division of nuclei in cells of ordinary size, seems to sanction this view; all the more, since a similar method of growth has been shown with certainty in plants. (Spirogya.) That the large marginal cells themselves divide, after the division of the nucleus, we conclude from the delicacy of the lines which here bound the separate cells. These lines, even on silver preparations,

are often scarcely to be distinguished, and on living corneas, viz., observed fresh in aqueous humor, are with great difficulty or not at all to be seen.

The foregoing description refers almost exclusively to corneas prepared with arg. nit. We omit the results obtained from the observation of corneas treated with chloride of gold and Mueller's solution, as they offer no new points of importance. We have investigated only a few living corneas in aqueous humor, and not much longer than three or four hours, since we soon convinced ourselves of the rapid death of the epithelium, even when the aqueous was frequently renewed.

The process of nourishing the cornea in the lymph space under the skin of the frog, after the epithelium had been removed from a small space by the knife, gave us no satisfactory results. While small losses of epithelium, on corneas otherwise undisturbed, were completely restored at the end of two days, we were unable to observe any certain signs of regeneration at the end of this time on those placed in the lymph space. These investigations were, indeed, made in the late fall and winter, and it is quite possible that this time of year is not particularly well suited for them. It is also very difficult by this method to avoid the adherence to the surface of the cornea, of groups of blood-corpuscles, which obscure the view of the other cells.

After simple brushing with a camel's hair pencil, as after the treatment with cantharides or collodium, small islands of epithelium, consisting of a few or single cells, often remain attached. Arnold thinks that these islands finally die, as he could not observe in them division of nuclei, or any other sign of new formation. So far as the cornea treated with the before mentioned solutions is concerned, we agree in this entirely with Arnold, provided that the effect has been sufficiently intensive to kill also the most deeply situated cells. One sees occasionally these dead cells at the end of three or four days. They are distinguished by the large shining nucleolus, the opaque contents, and the indistinct, as if corroded, contour. Often also the network of cement substance between the cells, with some protoplasma debris, remains a long time.

The behavior of the epithelial islands on such corneas as have not been exposed over the whole surface to the action of cantharides or collodium, but in the centre of which small portions of epithelium remain, is a different one. To better observe the changes in such cases, we have removed, by scratching with a sharp lancet, the epithelium up to the scleral border, with the exception of a square or circle, situated over the pupil, about a millimetre in diameter. During four days the operation was daily repeated, so far as was necessary to destroy any newly formed epithelium at the periphery. At the end of four days * the clear islands of epithelium, particularly in silver preparations, stand out clearly against the brown basis substance. At the periphery of the cornea no epithelium is to be seen, on the basis substance far and wide are no normal cells, but only single, very much changed, dead cells. The outer boundary of the island shows many projections, even when the original boundary was a sharply defined straight line. Many of the cells immediately contiguous to the edge present no special differences from the marginal cells of the peripheral epithelium when the loss of substance has been a central one, perhaps with the exception of the large number of nuclei and nucleoli (we have seen from five to six of the former) in many of the larger cells. The inequalities of the edge are not, however, as in the previous cases, produced only by single cells which project farther forward, or by small projections from them, but also by numerous club or twig-shaped outshoots, which may even unite with each other to form a net-work. These outshoots consist of cells with a somewhat flat surface, containing one or two large nuclei. The size of these cells is about double that of the white blood-corpuscles. Their number varies from two in the youngest outshoots, to forty and more in the larger. A few of the most peripheral of the cells remain in connection with the others only by a narrow surface; still others have already become perfectly isolated, and are separated from the rest by a narrow interspace.

Probably the apparently independent regeneration of epithelium takes place in this manner, and that the cases of epithelial regeneration from connective tissue, which Arnold states he has observed on the hard palate and skin of the head of the dog, may be thus explained. In all Arnold's experiments the excision of the edge of the wound was made scarcely earlier than the tenth or fourteenth day after the excision of the piece of skin. This is too late, as it seems to us, to prevent the objection that, the free islands of epithelium, which he observ-

* We intentionally omit the changes seen after a shorter time, since they presented nothing particularly noteworthy, but only similar pictures to those which we have already mentioned in describing the growth from the periphery.

ed, arose from the outshoot, from the periphery, and had become separated from their base by abundant granulations or by growth.

The cells at the base of the outshoots are in immediate connection with cells of the main island, of the same or somewhat greater size. Nowhere is a trace of a hyaline protoplasma to be seen. Even the finely granular zone, which, as Arnold says, always borders this protoplasma toward the loss of substance, is often wanting. The central cells of the island show throughout the same appearance as those of the normal cornea, except that an unusual number of them are in process of division, or contain several—three or four—nuclei.

Even small islands of epithelium therefore, although situated at a considerable distance from the vascular system, continue to live. They produce new epithelium, even if somewhat more slowly than the epithelium remaining after central loss of substance; and the regeneration always takes from the epithelium which had remained toward the defect.

Should the objection be made that, the outshoots of epithelium from the edge of the island are remains of the original epithelium, we reply that the lesser size of the cells, which decidedly distinguishes them from the ordinary epithelium, as well as their presence in islands which have been previously sharply defined by the knife in the form of a parallelogram, is a sufficient answer.

That amœboid cells take part in the new formation we were unable to show on frogs whose lymph space had been previously injected with finely divided coloring matter. Although the number of colored amœboid cells was in many cases much increased, we saw nowhere signs of a transformation of them into actual epithelium. The fact that the cells at the margin of the epithelium are already enlarged, at a time when the colorless contractile elements of the cornea are little, if at all, increased, and when in the neighborhood of the margin no such elements are present, shows also that the regeneration may, at least, take place without their intervention.

The results of our experiments on mammals (rabbits and guinea pigs) were similar. Here, in order to secure the perfect removal of the epithelium, at least over a certain space, we removed also the outer layers of the corneal tissue. By careful dissection a large portion of the surface layers may be removed in one piece. A pretty severe conjunctivitis and keratitis followed this procedure, but already in eight or ten days quite large losses of substance were completely closed over by epithelium. These cases also furnished nothing new of importance to add to what has been already related. Here, as in the frog, an enlargement and division of the marginal cells, without the intervention of a free protoplasma, and a growth of epithelium toward the loss of substance, took place.

The experiments by which, after total removal of the epithelium, we sought to prevent growth from the periphery, agree entirely in their results with those already mentioned. We used for this purpose exclusively frogs, and the whole of the epithelium was removed with a lancet to beyond the scleral border. This operation was repeated daily over a breadth of 1½ to 2 millimetres at the edge of the cornea, without disturbing the central portion. Unfortunately we were obliged to break off this series of experiments sooner than we had intended, on account of threatened loss of our animals.* For this reason we interrupted our experiments after eight or nine days.

The corneas of these animals, after preparation with arg. nit., showed, at the most, very small islands of epithelium quite near the scleral border. These were, however, even in the same frog, so inconstant, that we were led to regard them rather as unremoved fragments of the original epithelium, or of that which had grown from the periphery, than as independently formed islands, especially as the repeated removal of the epithelium from the neighborhood of the scleral border is rendered difficult by the swelling of the conjunctiva and lids.

The rest of the cornea was in many cases covered with a large number of amœboid cells (pus-corpuscles). When these lay together in small groups, they were slightly flattened on the contiguous surfaces (compressed granulation tissue). Near these cells appeared, singly or in groups of two or three, a few delicate, spindle-shaped or polygonal cells, two or three times as large as the granulation cells, consisting of finely granular protoplasma, and provided with a large bladder-like nucleus. We could not observe in them amœboid movements. With regard to the origin of these latter elements we are still in doubt. We cannot deny the possibility of their origin from the granulation cells, as many of these also were found with a larger nucleus. But whatever way be their origin, so much is

* An epidemic among our frogs had destroyed many of them.

certain; at the period mentioned no central islands of true corneal epithelium exist. The presence of isolated smooth cells upon the corneal surface offers so much the less proof of the origin of the outer epithelium independently of the original epithelial covering, since also in the corneal tissue, according to Carl Friedrich Mueller (Virchow's Archiv, Vol. 41), cells similar to those of the co-called serous epithelium are not very infrequently present.

EXPLANATION OF THE ILLUSTRATIONS.

FIG. 1. Surface view of a portion of a frog's cornea, three days after removal of the epithelium by collodium. a. Border of epithelium in process of regeneration. b. Corneal tissue. c. Finely granular substance which forms a narrow border at the epithelial edge. d. Young nucleus. Prepared with arg. nit. Objective 9 and ocular 2, Hartnack. Drawn with the camera lucida.

FIG. 2. Another part of the same preparation. a, b, c. As in Fig. 1. d. Border of the protoplasma of the marginal cells, which have been pushed outward. Magnified and drawn as in Fig. 1.

FIG. 3. Surface view of the cornea of a rabbit, three days after the removal of the epithelium and outer layers of the cornea, with the knife. Letters and preparation as above. Objective 5 and ocular 2, Hartnack. Camera lucida.

FIG. 4. Frog's cornea prepared as in Figs. 1 and 2. a, b, c. As in Fig. 1. d. The dark border of the corneal tissue interrupted by several parallel lines. Magnified and drawn as in Fig. 1.

FIG. 5. A. B. Two marginal cells of the regenerating epithelium of the frog's cornea. Preparation and magnifying power as in Fig. 1. A. 1. Original nucleus; 2. Young nucleus surrounded by a narrow, clear zone; 3. Nucleolus surrounded by a delicate but plainly contoured border. B. 1. Old nucleus; 2. Young incurved nucleus, with two nucleoli.

FIG. 6. Regeneration of epithelium of frog's cornea, after the central portions had been killed by collodium, but not removed. a, b, c. As in Fig. 1. d. Dead epithelium lying above the marginal cells. e. Dead, but still attached epithelium. Prepared, magnified and drawn as in Fig. 3.

FIG. 7. Outshoot from an island of epithelium allowed to remain in the centre of the frog's cornea, with prevention of new formation from the periphery. a. Separated epithelial cell. b. Edge of the main island. c. Corneal tissue. Objective 5 and ocular 3, Hartnack. Prepared and drawn as in Fig. 1.

FIG. 8. From the same preparation as Fig. 7. a. Junction of the outshoots of epithelium. Objective 7 and ocular 3, Hartnack.

"I SUPPOSE," said a quack, while feeling the pulse of a patient who reluctantly submitted to solicit his advice, "I suppose you think me a bit of a humbug?" "Sir," gravely replied the sick man, "I was not aware until now that you could so readily discover a man's thoughts by feeling his pulse."

CASE OF IMPACTED CALCULUS IN THE URETHRA. EXTERNAL URETHROTOMY. RECOVERY.

By M. F. GAVIN, M.D., F.R.C.S.I., &c., Surgeon to Out-patients, City Hospital, Boston.

HENRY M., a delicate lad, aged 10 years, born in South Boston and always lived there. Has had the diseases usual to childhood. No pump-water on the premises where he lives. About December, 1868, mother first noticed his water grow cloudy and thick, but free from blood, while the act of urinating caused intense pain in the region of the bladder, extending up towards the lumbar region. From January, 1869, until May of the same year, patient's general health failed, and incontinence of urine and severe "attacks of gravel" became frequent, when he entered the City Hospital under the care of my predecessor, the late Dr. Ropes, who failed to detect stone. Under treatment and rest he rapidly grew better, and left the hospital, feeling well. For some time after leaving the hospital he remained free from all symptoms of his trouble, except after severe exercise, when the pain in making water returned, and once or twice he suffered from retention, which was relieved by a hot bath.

Early in the autumn the "fits of gravel" returned, grew more severe, lasted longer, and were not relieved by the warm bath. About this time the patient had a very severe hæmorrhage from the urethra, probably caused by a rupture of a small portion of the urethra from the great straining of the patient during an "attack of gravel."

My first visit to him was in January, 1870, when he was suffering from one of these attacks, of unusual severity, which had lasted more than two days at the time of my visit. Three days before my visit the lad took severe exercise in running and jumping off a shed fourteen feet high to the ground, and that night began to complain of pain in urinating, extending up the urethra, and passing only a few drops at a time. There was constant pulling of the prepuce; no sleep; hot and feverish; appetite gone.

It was evident something should be done, and at once, as the little fellow was in agony; the bearing-down pains were really distressing to bear, hardly leaving the patient for a moment, and unless something were done, the bladder, which extended almost up to the umbilicus, was in danger of being ruptured.

A warm bath was first tried, without any

benefit; when I attempted to pass a No. 5 elastic catheter, but failed, owing to the pain and restless condition of the patient. The parents would not allow ether or chloroform to be given, preferring to wait a few hours before any operative measures were undertaken. After trying opiates and the warm bath for a few hours withqut relief, ether was given, when a foreign body could be felt filling the urethra about an inch in front of the bulb, which was shown, on passing a sound, to be an impacted stone. The parents preferred to have a consultation, when Dr. Thaxter was called in and gave me his valuable assistance during the operation.

An effort was first made to extract the stone with a long narrow forceps, but it failed. Dr. Thaxter held the stem firmly and drew back the scrotum, while an incision was made in the raphé just anterior to the scrotum: the stone was now pressed forward toward the cut and withdrawn by a forceps.

Very little bleeding followed the operation. A No. 5 elastic catheter was passed through the entire length of the urethra and retained by straps; the edges of the wound were brought together by two very firm silk sutures, with the expectation of obtaining union by first intention, as the wound did not differ from any ordinary flesh wound as long as the urine was not allowed to come in contact. An opiate was ordered in case he became restless.

Jan. 17th, twenty-four hours after operation. Patient had a very good night, slept well; no occasion to give opiate. Free flow of clear urine through the catheter; not any through the wound. Pulse 88; no heat of skin or headache; tongue clean. Cold-water dressing and milk diet.

18th.—Slept well; no heat of skin or headache; pulse 70; tongue clean and moist; wound partly united; sutures removed. Catheter withdrawn and larger one (No. 6) put into the bladder, with considerable difficulty.

19th.—Pulse 104; skin hot; tongue moist and coated. No swelling or redness of scrotum. Some pain in the right iliac region. A few drops of urine came through the wound. Catheter taken out. Cold-water dressing; liquid diet, and a saline purgative.

20th.—Pulse 68; tongue clean and moist. Bowels moved yesterday. Urine all came through the normal passage, without causing any pain.

21st.—Pulse 66; tongue clean; appetite good. Wound not quite healed; a few drops of urine came through this morning.

22d.—General condition excellent. Passes water freely and without pain, a few drops escaping through the lower angle of wound. No. 6 catheter passed and allowed to remain in for ten minutes. Wound touched with nitrate of silver.

From this time forth the patient did well, and was allowed his usual diet. Catheter (No. 6) was passed every third day for two weeks, when the wound was firmly united.

The unsettled state of many minor points in surgery was very well shown in this case.

1st. Was it better to remove the stone from that part of the urethra where its further progress was arrested, or to press it back towards the perinæum or membranous portion of the urethra? The latter proceeding is strongly advocated by Mr. Erichsen, who dreads the infiltration of urine taking place if the urethra is opened anterior to the scrotum, and if infiltration does not take place we are very apt to have a fistulous opening remain. No doubt Mr. Erichsen's suggestion has the advantage, that if other stones are present Allerton's or the lateral operation for stone may be done without waiting. On the other hand, if, as in the case reported, the stone is firmly impacted midway in the spongy portion of the urethra, to press it back to the membranous portion must lacerate the urethra, which is quite likely to be followed by infiltration of urine or organic stricture.

2d. Was it better to pass a catheter after the operation, or allow the urine to come in contact with the fresh wound in the urethra? On this point systematic works on surgery have nothing to say, while practical surgeons differ in practice. In the case reported we think the healing process would have been slower if the urine had been allowed to come in contact with the wound.

Treatment of Eczema.—Dr. Kent Spencer, of Bath, has found black wash useful as an application in eczema rubrum of the legs, mixed with a tenth part by measure of glycerine. Linen rags are soaked in this and laid on the parts and kept *in situ* by a bandage, but no oiled silk used. He renews the dressings twice daily, wetting them with warm water before removal. He has recently almost always been successful in such cases by this plan.—*Canada Medical Journal.*

Selected Papers.

FIBROUS TUMOR OF THE BLADDER SUCCESSFULLY REMOVED.

By A. Reeves Jackson, M.D., Chicago, Ill.

Mrs. K., a resident of Monroe county, Pennsylvania, aged 40 years; married; is the mother of four children, the youngest of whom is ten years old. She is of spare habit of body, and for a number of years has been afflicted with a large femoral hernia of the right side, for which mechanical support has been used. Her general health has usually been good.

I was called to see her December 9, 1869, and obtained the following history: During the past four or five weeks she had experienced a rather frequent desire to urinate, the passage of the water being attended with more or less pain. On several occasions the urine had been bloody. These attacks of irritability of the bladder although becoming latterly quite frequent, were not of long duration—rarely lasting more than ten or twelve hours—and had not been sufficiently severe to impel her to seek medical advice. Six days previously (3d inst.), after one of these attacks she suddenly found herself quite unable to urinate. There was a constant painful effort to do so, accompanied with many ineffectual straining efforts. A practitioner residing in the immediate vicinity was called to see her, and a variety of powerful diuretics, purgatives, &c., were prescribed. The pain meanwhile became constant and increased in severity. In the course of two or three days the urine began to dribble away, and the patient being unable to sit up, the bedding soon became saturated. Believing that his remedies had been *too effectual*, the doctor (*sic*) now commenced prescribing others, with the view of checking this profuse flow. Among these opium was given, and although it did not lessen the incontinence, it yet served a good purpose, by procuring partial relief from pain.

At the time of my visit she was still under the influence of an opiate given the previous evening. Her skin was cool and moist; tongue covered with a dry brownish coating; pulse 120, small, with a quick, sharp beat. The lower part of the abdomen was much distended, and yielded a dull sound on percussion. During the examination the patient became sufficiently aroused to recognize me, and begged that I would do something to relieve her. I introduced a catheter and drew off nearly six pints of stale, bloody, rather offensive urine, with very great relief. Suddenly the flow stopped. The enlargement of the hypogastrium although very much lessened was still distinctly perceptible, presenting the appearance of a rounded, well-defined tumor. Under the impression that some obstacle was impeding the further flow of urine, I withdrew the instrument a short distance, and this manœuvre not being successful, removed it entirely, in order to examine the openings. These being quite pervious, I was puzzled, and introduced it again. No urine appeared; and as I attempted to change the position of the instrument somewhat, I became conscious of the existence of an impediment to its usual freedom of motion. I could press it a short distance forward and toward the left side, but a strong resisting body effectually prevented the turning of the instrument, either backward or toward the right side. I passed a finger into the vagina, but could not by any manipulation succeed in feeling the catheter through its walls. A male instrument subsequently introduced gave similar results. While its point could be distinctly felt through the thin abdominal wall when pressed anteriorly, it could not be turned at all toward the right side, and very slightly toward the left; neither could its course be felt from the vagina.

This was at eight o'clock in the evening. The following morning I saw her again at an early hour and learned that she had passed a comparatively comfortable night, sleeping a considerable part of the time. There had been some dribbling of urine, and she was still unable to evacuate the bladder by any effort of her own.

Introducing a male catheter, I removed a little more than a pint of bloody urine, having a strong ammoniacal odor. Again, as on the previous evening, the flow abruptly stopped; again I found that no change either in the direction or position of the instrument was sufficient to restore it; and, again, the evacuation of the bladder did not remove the persistent globular hard tumor of the abdomen. In attempting to carry the instrument about in various directions—which was done in the most gentle manner, and without producing much pain—I found the same difficulty, or rather the same impossibility, as had been noticed the evening before. On the withdrawal of the instrument, I found that its openings were partially closed by clots of fresh blood.

As the patient's residence was about sixteen miles from my own, I left a catheter

with the husband, an intelligent German, instructing him sufficiently in its use, and ordered its employment at intervals of eight hours, or oftener if it should seem necessary in order to relieve pain.

I did not see my patient again for six days, at the end of which time I was summoned by telegraph, to visit her as quickly as possible. On my arrival, about noon, the husband informed me that, very early in the morning, his wife had awakened with a more intensely painful desire to urinate than she had experienced at any time since my former visit, accompanied by strong involuntary bearing-down efforts. As she could not void a single drop of urine—had not done so, in fact, since I saw her—he proceeded to introduce the catheter as usual, when, to his great surprise, he found himself prevented by the pressure of a mass of something resembling, as he said, a piece of boiled beef, having a grayish-red color, filling up and slightly protruding from the urethral orifice. In great consternation, he at once started for the nearest telegraph station, one mile distant, to summon me. On his return he discovered that the substance had disappeared into the bladder again. He now introduced the catheter without difficulty, and drew off a quantity of bloody urine, which had been set aside to await my coming, and which I found, on examination, to contain a large quantity of mucus and some pus in addition to the blood.

Several hours having elapsed since the bladder had been emptied, I introduced a catheter, and distinctly felt, as I did so, what I had not experienced on any former occasion, namely, an evident obstruction to its ready ingress. The impediment seemed to yield to moderate pressure, however, and the urine flowed freely. This latter had now a dark brown, muddy appearance, was highly offensive, and contained a large quantity of muco-pus. A small amount of fresh blood followed the withdrawal of the instrument.

With the view of making a more thorough exploration a sponge tent was introduced into the urethra and permitted to remain four hours. On removing it I was enabled to introduce the index finger sufficiently far to perceive the pressure of a tolerably dense mass with a smooth surface occupying the lower part of the bladder, and pressing against and somewhat into the vesical orifice of the urethra. A larger tent was now introduced, and as the presence of the first one had been productive of considerable pain, a full dose of morph. sulph. was administered at the same time. As it was impossible for me to remain with the patient, or, indeed, to see her again in less than twenty-four hours, I directed the husband to remove the tent at the end of four hours; and further, having provided him with polypus-forceps, a tenaculum, ligature-twine, &c., directed him to seize the protruding substance, should it again appear, and secure it against return until my arrival. On the following day he met me as I was approaching the house, and with a triumphant air showed me a small bottle in which was a reddish fleshy-looking mass about the thickness and nearly the length of a finger. It was tough, rather softer in some portions than others, and seemed to have been moulded to the shape of the urethra in its passage. It had made its appearance, he informed me, on the withdrawal of the tent, and he had seized it with the forceps and fingers, and making firm traction (here he had exceeded his instructions), had caused the patient very great pain, and had broken the substance off in the urethra, where he was unable again to reach it. The urethra being now very greatly irritated and excessively painful, it was deemed advisable to suspend, for a time, operative procedures. Cloths wrung out of a hot infusion of opium and arnica flowers were applied to the genitals, and a full dose of morphia given internally. She was also to have the catheter passed at regular intervals; the bowels were to be moved by enemata; and she was to have beef broth, porter, &c., daily, at proper intervals.

Two days passed. All had been done according to directions. The catheter had been regularly used with variable success. Sometimes the husband was aware of the existence of an impediment to its introduction, and at others he was unable to discover anything of the kind.

The irritation of the urethra having been sufficiently lessened, I introduced as large a sponge tent as possible, and removed it at the expiration of three hours. The passage was then sufficiently dilated to permit the forefinger to enter readily into the bladder, and with its point the growth could be distinctly felt. A long narrow bladed forceps was passed in, and efforts made to grasp a portion of the tumor, with very indifferent success, however. I only succeeded in detaching small portions, and bringing them away between the blades. These attempts were attended with considerable hæmorrhage, and I finally desisted. In a short time, and while I was pondering upon the best course to adopt, the patient was

seized with severe pain and vesical tenesmus, and made frantic efforts to urinate. I hastened to introduce the catheter, when I discovered a portion of the tumor showing itself at the orifice of the urethra. I at once grasped it with a pair of small placenta-forceps, and with a succession of swaying movements from side to side, drew it out about two inches. I then substituted my fingers for the instrument, and twisted the mass slowly, like a rope. The patient, although suffering the most acute pain, aided its expulsion by powerful bearing-down efforts. I succeeded, in this manner, in removing a portion of the growth eight inches in length, of the thickness of the thumb. Then it gave way, and the remaining portion receded into the bladder. I was much disappointed at this termination, as I had hoped to remove the entire mass at this time. Very little bleeding attended the operation, although a few clots of blood—the result, probably, of the attempts made an hour before with the forceps—escaped by the side of the tumor, as it was being withdrawn.

During the succeeding four or five days many pieces of the now disintegrated tumor came away. They varied very greatly in size, some being quite small—mere shreds, in fact—while others were an inch or more in length. The larger pieces moulded themselves, in their passage, to the size and shape of the urethral canal. Toward the last they became exceedingly offensive, as did also the urine, which was loaded with pus, blood, and numerous shreds. The larger pieces were taken care of and placed in alcohol, at my request. The smaller ones, and that part of the growth which was softened down and passed off with the urine, of course escaped. The amount preserved weighs eight and a half ounces, and forms a mass as large as the closed fist.

The general condition of the patient now rapidly improved, so that at the end of a fortnight she was able to walk about the house. Incontinence, however, had succeeded the retention, and this still remained. The urine, which was now quite normal in quality and amount, was passing away continually, much to the disgust and discomfort of the patient. The bladder had contracted adhesions with the surrounding viscera, and its walls, thickened and hardened by inflammatory deposits, could be distinctly felt, filling a space in the hypogastric region as large as that occupied by the gravid uterus at four months. It was thus prevented from being either a retaining or an expelling organ, and I had nothing better to suggest for the patient than the use of a urinal, which was procured for her, and which she wears with a good degree of comfort.

April 30th, I saw Mrs. K. again. She had then fully regained her general health. The incontinence was improving. In certain positions of the body she could retain the urine nearly an hour, and felt hopeful that she might get entirely well. The bladder appeared also to be regaining its power; for there were times when with one or two ounces of urine retained, she found herself able to expel it with a fair degree of force.

Submitted to microscopic examination, a section of the tumor presents the same fibrous and vascular appearances as are seen in the case of uterine fibroids; and, indeed, on comparing it with a specimen of the latter, the two, both in their general character and minute structure, appear to be identical.—*Chicago Medical Journal.*

Bibliographical Notices.

On Cholera and Choleraic Diarrhœa; their Nature, Cause and Treatment. Two Lectures, delivered at the Church Missionary College, Islington. By GEORGE JOHNSON, M.D. Lond., Professor of Medicine in King's College, London; Senior Physician of King's College Hospital; and Consulting Physician to the Church Missionary Society. London. 1870.

THE author, in this pamphlet of 47 pages, recapitulates in brief, clear and somewhat popular form views which he has previously from time to time expressed: first, in some reports of cases; next in 1855, in a considerable volume "On Epidemic Diarrhœa and Cholera;" and again in 1866 in a smaller book called "Notes on Cholera," ably and favorably reviewed by Sir Thomas Watson in the *Saturday Review*, and disinterestedly supported by the *British Medical Journal*, Dr. Markham, Editor.

Dr. Johnson has pushed his views in the face of strong opposition, with a zeal which indicates a thorough belief in their correctness and consequent importance. They are, perhaps, sufficiently well known among us not to require repetition; a statement of the main points, however, will aid in keeping the identity of the author with his doctrines.

Cholera is a disease resulting from the presence in the body of a material poison, derived from filth, recognized only by the symptoms it produces, and resembling in

its effects, *more than any other*, that which produces typhoid fever. The vomiting and purging are natural efforts to eliminate the poison. The collapse is the result of impeded or obstructed pulmonary circulation, the smaller vessels by contraction opposing the admission of the poisoned blood to the lungs. "In truth, as Sir Thomas Watson, in his review, remarks, 'this explanation derives strong confirmation, from the fact that it unlocks like the right key the whole of the pathological intricacies of the disease.'" Astringents and opiates oppose, cathartics and emetics favor the evacuation of the poison. "The rule in all cases is, *not to give the opiate until the morbid poison and its products have for the most part escaped; not to close the door until the enemy has been expelled.*" * * * * "*Opiates are useful to soothe the irritation after the evacuation of the bowel; they are useless and even dangerous when the blood is poisoned or the bowel filled with morbid secretions.*" * * * * "There is one symptom that especially forbids the use of opium, and that symptom is *cramps of the muscles.*" The condition of collapse is equally an indication of the circulation of the *materies morbi*, and forbids the use of opiates. Castor oil is the favorite cathartic.

For a proper elucidation of the theory, Dr. Johnson must be allowed to speak for himself. He claims unequalled results for the practice, but says it must be followed with full and persevering faith and with a judicious estimate of the demands of each case to be successful.

Medical and Surgical Journal.

Boston: Thursday, August 25, 1870.

ON CERTAIN CHOREIFORM MOVEMENTS OBSERVED IN EXPERIMENTS ON THE DOG.

At a séance of the Academy of Sciences in Paris, held in May, the attention of the members was directed by MM. Legros and Onimus to researches which they had made, of an interesting character. In order to study the choreiform movements of the muscles and the variations which are noticed in their form and intensity, they made use of the *graphic method* of delineation; the tendon of a muscle being exposed and fastened by a thread to the lever of the registering instrument, which marked the movements on a revolving cylinder.

They have, in the first place, proved that the intensity of the choreiform movements increases proportionally to their frequency, and that each accession of the convulsion is followed by complete repose. The regularity of the markings and the rhythm of the contractions was found to be in no manner dependent on the action of the heart, the shock of each pulsation in this way being shown to have no direct influence on the nervous elements of the cord. But in taking simultaneously the tracing of the pulse and of the choreic movement, if in certain cases the two occurred at the same moment, there was noticed at that point a marked dissimilarity between the two.

It is well known that anæsthetics cause the cessation of choreic movements; after having injected 3·50 grammes of hydrate of chloral into the rectum of a dog, a series of tracings was obtained in which the gradual diminution of the movements was clearly observed; and, moreover, they disappeared entirely before the voluntary motions were suspended.

By compressing the brain, the choreic movements are not interfered with; but, on the other hand, on giving anæsthetics which have a special determination to the sensory portions of the cord, the motions are abolished, a fact which leads us to believe that these portions of the nervous system, or the nerves dependent on them, are the seat of the disease. Following out these researches, the vertebral canal has been opened, and, on touching the posterior columns, energetic contractions have been obtained; when the cord, exposed to the air, has become cold, the movements grow feeble; to reëstablish them it is necessary to warm the cord artificially.

Besides these experiments, MM. Legros and Onimus have divided the posterior roots of the cord; this experiment was also tried by M. Bert, and with the same result, that is the rhythmic movements did not disappear. In another dog, after having cut the spinal cord on the median line, a portion of the cornua and the posterior columns was

excited; the rhythmic contractions became very feeble and, indeed, at some points seemed to have disappeared entirely; it was only by extensively wounding the posterior portion of the cord that the choreic movements were suspended.

It is, then, easy to show that the seat of chorea is in the nerve cells of the posterior cornua, or in the filaments which unite these to the motor cells. This opinion is confirmed by experiments by means of electricity. Induction currents directed to the choreic limb induce a tetanic contraction which abolishes entirely the rhythmic movements when the current is strong; with a very feeble current a certain degree of contraction is caused, which, without causing the movements to cease, modifies them and renders them feeble and irregular. Continued currents applied in the same regions give, in every case, a diminution of the intensity of the contractions.

Direct electrization of the spinal cord gives very interesting results. On dogs, in whom the cord was exposed and divided transversely in the upper portion, the experiment was first tried of using the direct continued current supplied by eight piles of Remak. The tracings obtained showed that, under the influence of an ascending current, the contractions increase in number and intensity, and that they continue longer; on the interruption of the current, the extent of the oscillations diminishes and they become more feeble than before electrization. On the contrary, the descending current, applied to the cord, induces more feeble contractions, which increase only on the removal of the application.

Especial importance is laid, by the experiments, on the direction of the current, and the observations made in these cases of chorea confirm all that has been observed on the subject; it is contrary to reason to attribute always to the contact of the positive or negative poles different physiological effects which one ought to ascribe to the direction of the current; it has been proved by repeating the experiment in another manner. The poles of the battery were applied, on the same dog, not only directly to the cord itself, but also to the extremities of the animal's body, and the modifications of the movements were the same as in the preceding experiment. In like manner, whenever the movements were at any time completely arrested, either under the influence of poisons or on account of the progressive feebleness of the animal, the rhythmic contractions could not at all times be excited by the ascending current. The section of the posterior columns did not interfere with the result of the experiment; nevertheless, it cannot be said that the excitement of the posterior roots does not have any influence on the intensity of the chorea, but the contrary; but although they modify this movement, they have no influence in its production.

If the posterior roots of the cord are excited mechanically or by induction currents, it is shown that, after the cessation of the excitement, the oscillations acquire a remarkable force. This experiment adds a new proof to the localization of chorea in the posterior cornua of the gray substance of the cord.

Injections of Warm Water into the Tunica Vaginalis in Hydrocele. By Prof. Albansee.—In the cure of hydrocele surgeons have, after the evacuation of the fluid, employed various means for the production of adhesive inflammation. The injection of iodine has long been used with good effect; but while some have sought for means of more active irritation, others, as Dr. Albansee, have employed methods more simple in their action. Prof. Albansee has studied the action of injections of air into the tunica vaginalis. Having employed them in twelve cases, he has not found any marked advantage.

In another series of experiments, he has used injections of water at a temperature of 40° to 45° centigrade (107° to 113° Fahr.). The phenomena which immediately follow the operation are a trifling feeling of burning in the part, a moderate inflammation with a new effusion of fluid, and a rapid absorption. The injection of warm water has been used with success in a hydrocele which had resisted the employment of iodine. In only one patient has a suppurative inflammation occurred, and this was

very probably caused by an infiltration of the water into the subcutaneous tissue of the scrotum.

Case I.—Right hydrocele, of three years' duration, in a man 40 years of age. Puncture and injection of water at 45° cent.; retained for two minutes. There was a very limited suppuration of the subcutaneous tissue. Cured in twenty-three days.

Case II.—Patient 23 years of age. Right hydrocele of two years' standing. There had been two punctures, in the first of which iodine had been used, and, in the second, insufflation of air. A puncture was made and 300 grammes of water at 42° cent. injected. The sac of the hydrocele contained 3 decilitres (10 ounces) of an albuminous fluid. Cured in eight days.

Case III.—A man 55 years of age; left hydrocele of a year's duration. Cure in eight days.

Case IV.—Right hydrocele and left hydro-sarcocele of syphilitic origin. Cure equally rapid.

Case V.—Patient 56 years of age. Right hydrocele of five years, having already been treated by injection of iodine. The patient went away after the operation, and the result is unknown.

In three other cases a cure resulted without accident.

Dr. Albansee is induced by these cases to look favorably on the injections of warm water. They have certainly the merit of being more easy of application than the injections of iodine, but it may be questioned if they are, in all cases, equally reliable.—*Gazetta Clinica di Palermo*, No. 1, 1870.

On the Use of Raw Meat in Diarrhœa and Dyspepsia. By Robert Druitt,, M.R.C.P., &c.—I learned the use of raw meat as a remedy for diarrhœa, from the late estimable Professor Trousseau, during a visit paid to his clinique at the Hôpital des Enfans Malades in 1851. Since that time I have had abundant opportunities of proving its efficacy, and although I know that it is largely used by some physicians, it may not be unseasonable at the present time to call attention to it, and to encourage its more general use.

Let me begin with a few words on the mode of preparing it. The meat used may be either mutton or beef—say a tit-bit of the loin of mutton, or of the fillet or other tender part of beef. This must be submitted to a process either of pounding, or of scraping, so as to get out the red soft muscular substance, as free as possible from all fat and fibre. The muscular substance so prepared forms a soft pink pulp, and even a good-sized piece of raw meat seems to yield wonderfully little by comparison with the parts that are rejected. It must be a pulp, giving no feeling of resistance when squeezed between the fingers.

The modes of administration are many. It may be given by itself, and this way is best in the case of young children. Very young infants may suck it from the end of their nurse's finger, and most of them take it greedily enough in this way. Children who are older, say from 2 to 5, may swallow it if dusted over with white sugar. Older persons may take it conveniently if diffused through a little strong beef-tea. But there is another way for which I am indebted to a lady who has made very large use of this remedy in the case of her invalid daughters, and which is known amongst a pretty wide circle as *jellied chop*. This consists in diffusing the meat pulp through a stiff meat jelly, and allowing it to cool in a shape. This is eaten like a spice, and is very nice to any one whose prejudices are not aroused by the notion of rawness. Salt and other condiments may be added at discretion.

The cases in which raw meat has peculiar efficacy are those in which other food passes undigested, and adds to the irritation of bowels in a state of diarrhœa. It seems to furnish the most efficient kind of nutriment with least inconvenience from bulk or other quality, and to be digested and absorbed with as little fæcal residuum as possible. Still there must be something more about it than this; for the liquid essence of beef will not take its place, neither will cooked meat.

First amongst the cases in which it is useful may be mentioned any acute cases of infantile diarrhœa, especially the infantile "cholera" of summer. No matter what medicines and what other kind of food may be used, I believe raw meat to be in itself both a remedy for the diarrhœa and a nutriment that may keep the child alive till the disease passes off.

Secondly, in the chronic diarrhœas of children, arising from scanty food, or what comes to the same thing, food which cannot

be digested, and which consequently passes the bowels as a foreign offending substance, here the raw meat acts as food and medicine.

In the habitual diarrhœa associated with "marasmus"—that is, with the superficial ulceration of the intestinal mucous membrane, and enlarged mesenteric glands of strumous children—the raw meat, especially in the form of the "jellied chop," is of most especial service. It is curious to see in cases of this sort how absolutely the stomach sometimes refuses to act upon the food put into it, so that meat, milk, &c., may be recognized unaltered in the fæces. It is just in these cases that the raw meat showed itself susceptible of quick digestion in the stomach. The cases which the ancients called *lienteria*, or *intestinorum lævitas*, and which were designated in England in the last century "lubricity of the intestines," in which the stomach and bowels are so irritable that they pass on and eject the food before it has had time to be dissolved and absorbed—are equally benefited by the use of raw meat.

Lastly, there are the cases of the obstinate vomiting of pregnancy, whether attended with diarrhœa or not. This is a kind of a case in which no remedy is unwelcome or superfluous. I cannot take to myself the credit of suggesting it, for the mother of a young pregnant lady who was in imminent danger of exhaustion from vomiting had witnessed the good effects of this food in the case of another daughter who died of ulceration of the intestines, and gave it of her own accord. But I can bear testimony to the fact that the raw meat was taken readily and kept down when almost every other food was loathed and vomited, and I consider the patient's safety largely due to it.

There are other cases of atrophy, dyspepsia, and malnutrition in which I have found it useful. I should like also to say a few words on some other uses of meat, cooked as well as raw; but at present I wish mainly to call the attention of my medical brethren to its efficacy in diarrhœa, which may be expected to be the cause of an abundant mortality of infants during the next two months.—*London Medical Times and Gazette*, July 2, 1870.

Diagnosis of Renal Disease from Blood-corpuscles in the Urine.—Dr. Joseph G. Richardson, Microscopist to the Pennsylvania Hospital, Philadelphia, has applied to the elucidation of the condition of the kidney in renal disease the well-known views of Cohnheim, regarding the relation of the white blood-corpuscles to the inflammatory process. If both red and white corpuscles are present in the urine, and if it can be ascertained that their occurrence is independent of vesical irritation, the following indication may be derived from their relative proportion.

When the red corpuscles greatly exceed the white in number, true hæmorrhage has taken place from the kidney. This conclusion will be strengthened if no tube-casts be found, and the albumen be present in such quantity as will correspond to the amount of corpuscles, supposing both to be furnished by the liquor sanguinis.

When the white corpuscles are more than one twenty-fifth of the red, there is inflammation of the kidney of either an acute or subacute kind, and the danger will be found to be in direct proportion to the total amount of corpuscles.

When few or no red corpuscles are found to be mixed with the white, chronic inflammation is present, and is proportionate in extent to the number of blood-corpuscles.

In cases of acute Bright's disease, passing into the stage of fatty degeneration, the appearance in the urine of epithelium containing oil globules, points to the change from the stage of inflammation, and these epithelial cells will be found, according to the author, to vary inversely with the number of white corpuscles present, the albumen remaining the same in amount.—*Baltimore Medical Journal.*

Chloroform in the Treatment of Biliary Calculi. By John Barclay, M.D., Physician to the Infirmary, Leicester.—Seeing some reference in a contemporary periodical to the proposed use of chloral as a solvent of biliary calculi, I crave space to state that I have met with very great success from the internal administration of chloroform in that disease.

I first used it in 1861, in the case of a clergyman, aged 58. He had suffered for twenty-three years from gall-stones; the peculiar pain, jaundice, with subsequent discharge, by stool, of the calculi, coming on so suddenly and without warning, as seriously and frequently to interfere with his duties. Just then, writing on alcohol, I had been studying the experiments of Lallemand and others on the existence of alcohol unchanged in the blood. Knowing that ethers are solvents of cholesterine, I ventured, on his third attack in that year, to prescribe chloroform in doses of two or

three drops, three or four times a day, on the chance of its reaching the calculi through the blood. To his surprise and my gratification, pain, tenderness, distention and jaundice disappeared together, and in the eight years since elapsed he has never had another attack. He keeps a bottle of "chloric ether" by him, for occasional use. I have found it to give invariable and permanent relief in many instances since.

The theory of thus dissolving the calculi *in situ*, followed by the disappearance of the symptoms, leads to a deduction that may be legitimate, that relief was obtained by their being so dissolved.—*British Medical Journal.*

On the Solubility of some Chemicals in Glycerin. By Klever.—The author found that 100 parts glycerin dissolve the annexed quantities of the following chemicals:—

Acid. arseniosum,	20	Morphia,	0.45
" arsenicum,	20	Morph. acetas,	20
" benzoicum,	10	" murias,	20
" boracicum,	10	Phosphorus,	0.20
" oxalicum,	15	Plumbi acetas,	20
" tannicum,	50	Potassæ arsenias,	50
Alumen,	40	" chloras,	3.50
Ammon. carb.,	20	Potassii bromid.,	25
" murias,	10	" cyanid.,	32
Antimonii et potas. tart.	5.50	" iodid.,	40
Atropia,	3	Quinia,	0.50
Atrop., sulph.,	33	Quiniæ tannas.,	0.25
Barii chlorid.,	10	Sodæ arsenias,	50
Brucia,	2.25	" bicarbon.,	8
Calcii sulphid.,	5	" boras,	60
Cinchonia,	0.50	" carbonas,	98
Cinchon. sulph.,	6.70	" chloras,	20
Cupri acetas,	10	Sulphur,	0.10
" sulph.,	30	Strychnia,	0.25
Ferri et potass. tart.,	8	Strychn. nitras,	4
" lactas,	16	" sulphas,	22.50
" sulphas,	25	Urea,	50
Hydrarg. chlor. corr.,	7.50	Veratria,	1
" cyanid.,	27	Zinci chlorid.,	50
Iodinium,	1.90	" iodid.,	40
		" sulphas,	35

—*Neues Jahrb. f. Pharm.*, 1869, from *Pharm. Zeitsch. f. Russl.*

The Cause of Summer Cholera.—C. F. Buckley, M.D., of San Francisco, Cal. (*California Medical Gazette*), in a recent paper before the San Francisco Medical Society, after dividing diarrhœa into six different varieties, adds a seventh, viz., summer cholera. He rejects the idea that fruit is the general cause of summer cholera, and is inclined to think it is due to an undue elevation of temperature; he also believes the affection is merely a modification, in a milder degree, of insolation or sunstroke. With undue elevation of temperature in the first place, the branches of the hepatic artery become expanded, causing more or less obstruction to the portal circulation; secondly, the smaller branches of the mesenteric arteries enlarge, causing more or less obstruction in the villous circulation. It is quite clear that a continuation of both causes will produce very extensive congestion of the intestinal capillary circulation, and so leads ultimately to diarrhœa.

In concluding, he advocates the "castor-oil treatment," which, in Asiatic cholera, yielded more favorable results in the vast majority of cases, in the institution with which he was connected, than any other remedy. The castor-oil should be combined with mucilage and chloric ether.

He has never tried cooling draughts, but intends to do so at the earliest opportunity. —*N. Y. Medical Record.*

The Stetho-Sphygmograph. By T. Hawksley, M.D., M.R.C.P.—At a meeting of the Medical Society of London, on Nov. 8th, Dr. Hawksley read a paper on the "Stetho-Sphygmograph," as an aid to the physiological and pathological investigation of the functions of respiration and circulation. He exhibited the practical application of the instrument on a case of phthisis pulmonalis, and one of well-marked mitral regurgitation. In every case three simultaneous and synchronous tracings of moving organs are taken—as, for example, the two lungs and the radial pulse; or the heart, the radial pulse, the carotid or the femoral. It was shown that the tracings would show any disparity in the action of the two lungs, also the relation of inspiration to expiration; and, associated with the pulse tracing, it afforded the opportunity of observing, not only the peculiarities or modifications of the circulation, as in the case of Marey's sphygmograph, but in addition, their relation to the respiratory process. By aid of this instrument, any question as to relative time in the transmission of the blood-wave through the arteries may be solved; as, for example, the time occupied in transmission to the radial, the carotid, or the femoral artery. This may be found to have important connection with the diagnosis of aneurisms and tumors, as well as with diseased states of the arteries with chronic diseases of organs.—*Lond. Lancet.*

Reproductions of Limbs.—M. Philippeaux has proved for fish what he had already demonstrated in the case of newts, viz., that when the limb is removed below the scapula or ilium it is reproduced. But when the scapula or ilium is removed no reproduction takes place.—*Monthly Microscopical Journal.*

Medical Miscellany.

PRODUCTION OF BONE FROM MEDULLA.—An interesting "provisional communication" appears in No. 24 of the *Centralblatt*, from the pen of M. Baikow, on the effects of transplantation of medulla. M. Baikow made two series of experiments. In one set, which were thirty-eight in number, the medulla from the femur or tibia of a dog was placed under the skin of the back of another dog; whilst in a second set, twenty-eight in number, the marrow was inserted beneath the skin of the back of the same individual. The first set of experiments all failed; bone was formed in none. In the second set fourteen cases succeeded—i. e., bone was actually formed; whilst in the remaining six cases the changes that occurred in the early stages were followed. The remaining eight cases were unsuccessful. In the fourteen successful cases bony masses were found in various stages of development, from the earliest rudiments to complete formation, with Haversian canals, lamellæ, stellate lacunæ, and medullary cavities filled with medulla. Up to the present time, M. Baikow's experiments extend only to the seventy-sixth day. In one case, at the sixty-first day, not only was complete bone present, but fibro-cartilage. The results of examinations showed that the medulla, after transplantation, first passed into the condition of fibrous tissue, from which by the proliferation of the cellular elements, bone or cartilage was developed. M. Baikow's results are in opposition to those of M. Ollier, but corroborate those of M. Goujon.—*Lancet.*

A NEW VESICANT.—In a recent number of the *Journal de Chimie Médicale*, M. Delpech calls attention to the defects of the ordinary preparations of cantharides; the proportion of the active agent, or cantharidin, varying, the presence of fatty or oily substances sometimes causing the absorption of a dangerous poison, and the rosin or turpentine employed in the composition of the plaster being an unnecessary irritant. In place of this, he recommends the cantharidinate of potash, which is of a very stable composition, has no odor, and possesses a vesicant action in a high degree. He recommends as the best formula for the plaster:—Gelatin, 2·09 parts; water, 10 parts; alcohol, 10 parts; cantharidinate of potash, 0·20 part; glycerine, 9·5 parts. The mass should be equally spread on thin gutta percha, a definite quantity being present in each square inch.—*Ibid.*

ABERNETHY'S DISLIKE TO UNNECESSARY TALK.—People who came to consult this eccentric man took care not to offend him by bootless prating. A lady on one occasion entered his consulting room, and put before him an injured finger, without saying a word. In silence Abernethy dressed the wound, when instantly and silently the lady put the usual fee on the table and retired. In a few days she called again, and offered her finger for inspection. "Better?" asked the surgeon. "Better," answered the lady, speaking to him for the first time. Not another word followed during the rest of the interview. Three or four similar visits were made, at the last of which the patient held out her finger free from bandages and perfectly healed. "Well?" was Abernethy's monosyllabic inquiry. "Well," was the lady's equally brief answer. "Upon my soul, madam," exclaimed the delighted surgeon, "*you are the most rational woman I ever met with.*"—*Jeaffreson's Book about Doctors.*

TO CORRESPONDENTS.—Communication accepted:—Cases of Zoster.

PAMPHLETS RECEIVED.—Reform. Medicine and Morals. No. 3. An Address delivered before the Onondaga Med. Society, at Syracuse, N. Y., June 14, 1870, by J. A. Mowris, M.D.—Man's Power over Nature, and Medicines as a Means by which he aids and controls the Laws of Life. An Address delivered before the Indiana State Medical Society, May 17, 1870, by George Sutton, M.D., Aurora, Ind.—Transactions of the Indiana State Medical Society, 1870. Pp. 164.—On the Origin of Diabetes, with some New Experiments regarding the Glycogenic Function of the Liver. By W. T. Lusk, M.D., Professor of Physiology, Long Island Medical College. Pp. 19.—Eighteenth Annual Report of the Trustees of the Boston Public Library, 1870. Pp. 64.

DIED,—At Burlington, Vt., August 16, Dr. Leonard Marsh, an old resident of that city, and for fifteen years a Professor in the University of Vermont.

Deaths in seventeen Cities and Towns of Massachusetts for the week ending Aug. 20, 1870.

Cities and towns.	Number of deaths in each place.	Prevalent Diseases		
		Cholera Infantum.	Consumption.	Dysentery & diarrhœa.
Boston	161	36	20	23
Charlestown . .	21	5	2	5
Worcester	22	4	2	1
Lowell	27	6	7	2
Chelsea	6	0	1	0
Cambridge . . .	29	11	4	0
Salem	9	3	0	1
Lawrence	11	1	2	0
Springfield	2	1	0	0
Lynn	18	3	4	1
Pittsfield	1	0	0	0
Gloucester	15	0	2	0
Fitchburg	6	1	0	1
Newburyport . .	1	0	0	0
Somerville . . .	11	3	2	1
Fall River	15	4	4	1
Haverhill	7	1	3	0
	361	81	53	36

From all the above places there are reported twelve deaths from typhoid fever and nine from whooping cough.

GEORGE DERBY, M.D.,
Secretary of State Board of Health.

DEATHS IN BOSTON for the week ending Saturday, Aug. 20th, 161. Males, 80; females, 81. Accident, 2—anæmia, 1—apoplexy, 2—asthma, 1—disease of the bowels, 3—congestion of the brain, 2—disease of the brain, 4—bronchitis, 3—cancer, 2—cholera infantum, 38—cholera morbus, 1—colic, 1—consumption, 20—convulsions, 1—croup, 2—cyanosis, 1—debility, 2—diarrhœa, 12—dropsy, 2—dropsy of the brain, 2—drowned, 2—dysentery, 11—scarlet fever, 1—typhoid fever, 6—disease of the heart, 3—infantile disease, 6—intemperance, 2—disease of the kidneys, 1—congestion of the lungs, 1—inflammation of the lungs, 5—marasmus, 7—old age, 3—premature birth, 2—puerperal disease, 1—rheumatism, 1—scrofula, 1—stone (in the bladder), 1—trismus neonatorum, 1—unknown, 3—whooping cough, 1.

Under 5 years of age, 93—between 5 and 20 years, 7—between 20 and 40 years, 19—between 40 and 60 years, 23—above 60 years, 19. Born in the United States, 123—Ireland, 26—other places, 12.